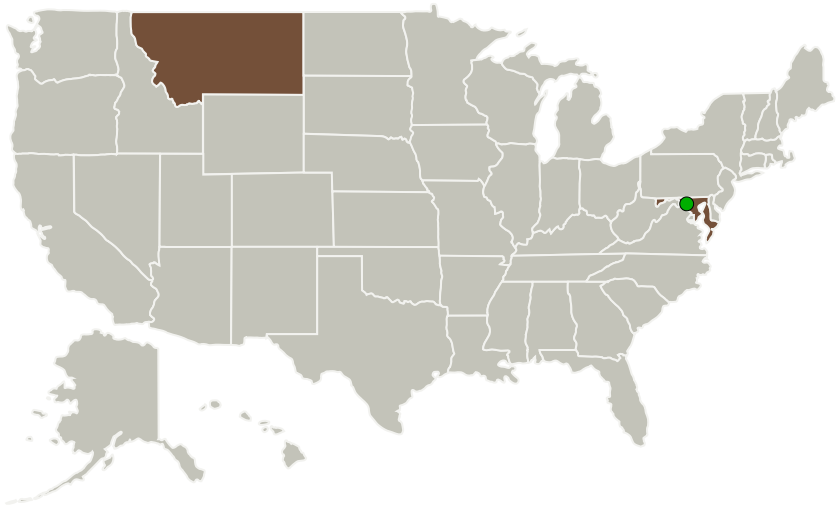
Ridge Waveguide Structures in Magnesium-Doped Lithium Niobate, Phase II

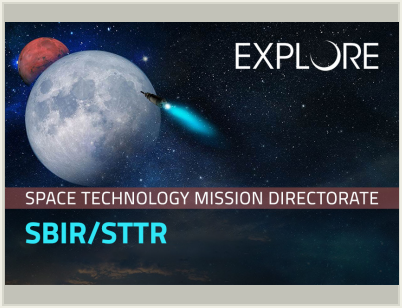
Completed Technology Project (2010 - 2012)

Project Introduction

AdvR, Inc. proposes the development of an efficient process for fabricating ridge waveguides in magnesium-doped lithium niobate (MgO:LN). The effort will include, but will not be limited to, fabricating ridge waveguides in periodically poled MgO:LN for highly efficient, single-pass, quasi phase-matched frequency conversion. Ridge waveguides in MgO:LN will significantly improve the performance (power handling and conversion efficiency), increase photonic component integration, and be well suited to space based applications. The key innovation in this effort is to combine recently available large, high photorefractive damage threshold, z-cut 5% MgO:LN with novel ridge fabrication techniques to achieve high optical power, low cost, high volume manufacturing of frequency conversion structures. The ridge waveguide structure maintains the characteristics of the periodically poled bulk substrate, allowing for the efficient frequency conversion typical of waveguides and the high optical damage threshold and long lifetimes typical of the doped bulk substrate.

Primary U.S. Work Locations and Key Partners





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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
ADVR, Inc.	Lead Organization	Industry	Bozeman, Montana
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland
Montana State University - Bozeman	Supporting Organization	Academia	Bozeman, Montana

Primary U.S. Work Locations	
Maryland	Montana

Project Transitions

August 2010: Project Start

November 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139408)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ADVR, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

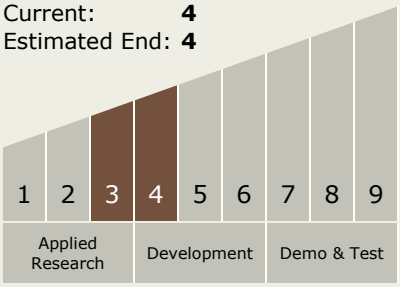
Carlos Torrez

Principal Investigator:

Todd Hawthorne

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Completed Technology Project (2010 - 2012)

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.3 Power Management and Distribution
    - TX03.3.3 Electrical Power Conversion and Regulation

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System